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- ☐ 1. 6504006. 12 Oct 01; 07 Jan 03. Substrate peptides and assays for detecting and measuring proteolytic activity of serotype A neurotoxin from clostridium botulinum. Shine; Nancy Rose, et al. 530/323; 435/975 530/327. A61K038/04 C07K016/00 C07K017/00 C07K005/00 G01N033/53.
-
- ☐ 2. 6203794. 01 May 97; 20 Mar 01. Modification of clostridial toxins for use as transport proteins. Dolly; James Oliver, et al. 424/184.1; 424/164.1 424/167.1 424/178.1 424/179.1 424/183.1 424/234.1 424/235.1 424/236.1 424/239.1 424/247.1 424/832 530/300 530/350. A61K039/395 A61K039/02 A61K038/00 C07K014/00.
-
- ☐ 3. 5965699. 06 Nov 96; 12 Oct 99. Assay for the proteolytic activity of serotype a from clostridium botulinum. Schmidt; James J., et al. 530/326; 435/183 435/252.7 435/4 435/7.1 435/7.71 435/7.72 435/842 530/300 530/324 530/325 530/327 530/328 530/329 530/330 530/333 530/335 530/337 530/350 530/839 930/10 930/20. C07K007/00 C12Q001/00 G01N033/52.
-

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Terms	Documents
5965699	3

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ID SN25_DROME STANDARD; PRT; 212 AA.
AC P36975;
DT 01-JUN-1994 (Rel. 29, Created)
DT 01-JUN-1994 (Rel. 29, Last sequence update)
DT 15-SEP-2003 (Rel. 42, Last annotation update)
DE Synaptosomal-associated protein 25 (SNAP-25).
GN SNAP25.
OS Drosophila melanogaster (Fruit fly).
OC Eukaryota; Metazoa; Arthropoda; Hexapoda; Insecta; Pterygota;
OC Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha;
OC Ephydroidea; Drosophilidae; Drosophila.
OX NCBI_TaxID=7227;
RN [1]
RP SEQUENCE FROM N.A.
RC TISSUE=Head;
RX MEDLINE=94043281; PubMed=8226991;
RA Risinger C.; Blomqvist A.G., Lundell I., Lambertsson A.,
RA Nassel D., Pieribone V.A., Brodin L., Larhammar D.;
RT "Evolutionary conservation of synaptosome-associated protein 25 kDa
RT (SNAP-25) shown by Drosophila and Torpedo cDNA clones.";
RL J. Biol. Chem. 268:24408-24414(1993).
RN [2]
RP SEQUENCE FROM N.A.
RX MEDLINE=97417485; PubMed=9272858;
RA Risinger C., Deitcher D.L., Lundell I., Schwarz T.L., Larhammar D.;
RT "Complex gene organization of synaptic protein SNAP-25 in Drosophila
RT melanogaster.";
RL Gene 194:169-177(1997).
CC !- FUNCTION: MAY PLAY AN IMPORTANT ROLE IN THE SYNAPTIC FUNCTION OF
CC SPECIFIC NEURONAL SYSTEMS. ASSOCIATES WITH PROTEINS INVOLVED IN
CC VESICLE DOCKING AND MEMBRANE FUSION.
CC !- SUBCELLULAR LOCATION: COMPLEXED WITH MACROMOLECULAR ELEMENTS OF
CC THE NERVE TERMINAL.
CC !- TISSUE SPECIFICITY: EXCLUSIVELY FOUND IN BRAIN AND GANGLIA.
CC !- SIMILARITY: BELONGS TO THE SNAP-25 FAMILY.
CC !- SIMILARITY: CONTAINS 2 T-SNARE COILED-COIL HOMOLOGY DOMAINS.
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DR EMBL; L22021; AAA16059.1; -.
DR EMBL; U81153; AAB39757.1; -.
DR EMBL; U81147; AAB39757.1; JOINED.
DR EMBL; U81148; AAB39757.1; JOINED.
DR EMBL; U81149; AAB39757.1; JOINED.
DR EMBL; U81150; AAB39757.1; JOINED.
DR EMBL; U81151; AAB39757.1; JOINED.
DR EMBL; U81152; AAB39757.1; JOINED.
DR FlyBase; FBgn0011288; Snap25.
DR GO; GO:0005886; C:plasma membrane; NAS.
DR GO; GO:0005486; F:t-SNARE activity; NAS.
DR GO; GO:0007269; P:neurotransmitter secretion; NAS.
DR GO; GO:0016081; P:synaptic vesicle docking; NAS.
DR GO; GO:0016083; P:synaptic vesicle fusion; NAS.
DR InterPro; IPR000928; SNAP-25.
DR InterPro; IPR000727; T_SNARE.
DR Pfam; PF00835; SNAP-25; 1.
DR SMART; SM00397; t_SNARE; 2.
DR PROSITE; PS50192; T_SNARE; 2.
KW Synaptosome; Neurone; Repeat; Coiled coil.

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FT  DOMAIN      148     210     T-SNARE COILED-COIL HOMOLOGY 2.
FT  DOMAIN      91      99      CYS-RICH.
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    GEQLDRIEEG MDQINADMRE AEKNLSGMEK CCGICVLPCN KSQSFKEDDG TWKGNDDGKV
    VNNQPQRVMD DRNGMMAQAG YIGRITNDAR EDEMEENMGQ VNTMIGNLRN MALDMGSELE
    NQNRQIDRIN RKGESNEARI AVANQRAHQL LK
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ID BXA1_CLOBO STANDARD; PRT; 1295 AA.
 AC P10845; P01561; P18639;
 DT 01-JUL-1989 (Rel. 11, Created)
 DT 01-JUL-1993 (Rel. 26, Last sequence update)
 DT 28-FEB-2003 (Rel. 41, Last annotation update)
 DE Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
 DE (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
 DE chain; Botulinum neurotoxin A, heavy-chain].
 GN BOTA OR BNA OR ATX.
 OS Clostridium botulinum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1491;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=NCTC 2916;
 RX MEDLINE=90235864; PubMed=2185020;
 RA Thompson D.E., Brehm J.K., Oultram J.D., Swinfield T.-J.,
 RA Shone C.C., Atkinson T., Melling J., Minton N.P.;
 RT "The complete amino acid sequence of the Clostridium botulinum type A
 RT neurotoxin, deduced by nucleotide sequence analysis of the encoding
 RT gene.";
 RL Eur. J. Biochem. 189:73-81(1990).
 RN [2]
 RP SEQUENCE FROM N.A.
 RC STRAIN=62A;
 RX MEDLINE=90264400; PubMed=2160960;
 RA Binz B., Kuarzono H., Wille M., Frevent J., Wernars K., Niemann H.;
 RT "The complete sequence of botulinum neurotoxin type A and comparison
 RT with other clostridial neurotoxins.";
 RL J. Biol. Chem. 265:9153-9158(1990).
 RN [3]
 RP SEQUENCE OF 1-65 FROM N.A.
 RC STRAIN=62A;
 RX MEDLINE=97016817; PubMed=8863443;
 RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
 RT "Organization and phylogenetic interrelationships of genes encoding
 RT components of the botulinum toxin complex in proteolytic Clostridium
 RT botulinum types A, B, and F: evidence of chimeric sequences in the
 RT gene encoding the nontoxic nonhemagglutinin component.";
 RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
 RN [4]
 RP SEQUENCE OF 1-34 FROM N.A.
 RC STRAIN=Hall;
 RX MEDLINE=89350959; PubMed=2669749;
 RA Betley M.J., Somers E., Dasgupta B.R.;
 RT "Characterization of botulinum type A neurotoxin gene: delineation of
 RT the N-terminal encoding region.";
 RL Biochem. Biophys. Res. Commun. 162:1388-1395(1989).
 RN [5]
 RP SEQUENCE OF 1-18 FROM N.A.
 RC STRAIN=Type A NIH;
 RX MEDLINE=96096783; PubMed=8521962;
 RA Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
 RT "Molecular characterization of two forms of nontoxic-nonhemagglutinin
 RT components of Clostridium botulinum type A progenitor toxins.";
 RL FEBS Lett. 376:41-44(1995).
 RN [6]
 RP SEQUENCE OF 1-16.
 RX MEDLINE=84178501; PubMed=6370252;
 RA Schmidt J.J., Sartymerthly V., Dasgupta B.R.;
 RT "Partial amino acid sequence of the heavy and light chains of
 RT botulinum neurotoxin type A.";
 RL Biochem. Biophys. Res. Commun. 119:900-904(1984).
 RN [7]

RP SEQUENCE OF 1-46.
RA Dasgupta B.R., Foley J., Niece R.;
RT "Partial sequence of the light chain of botulinum neurotoxin type A.";
RL Biochemistry 26:4162-4162(1987).
RN [8]
RP SEQUENCE OF 1-5 AND 444-456.
RX MEDLINE=91120847; PubMed=2126206;
RA Dasgupta B.R., Dekleva M.L.;
RT "Botulinum neurotoxin type A: sequence of amino acids at the
RT N-terminus and around the nicking site.";
RL Biochimie 72:661-664(1990).
RN [9]
RP SEQUENCE OF 448-464 AND 872-895.
RX MEDLINE=89024662; PubMed=3178218;
RA Sathymoorthy V., Dasgupta B.R., Foley J., Niece R.L.;
RT "Botulinum neurotoxin type A: cleavage of the heavy chain into two
RT halves and their partial sequences.";
RL Arch. Biochem. Biophys. 266:142-151(1988).
RN [10]
RP SEQUENCE OF 448-482.
RX MEDLINE=85285016; PubMed=3896784;
RA Shone C.C., Hambleton P., Melling J.;
RT "Inactivation of Clostridium botulinum type A neurotoxin by trypsin
RT and purification of two tryptic fragments. Proteolytic action near
RT the COOH-terminus of the heavy subunit destroys toxin-binding
RT activity.";
RL Eur. J. Biochem. 151:75-82(1985).
RN [11]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94063091; PubMed=8243676;
RA Schiavo G., Santtuci A., Dasgupta B.R., Mehta P.P., Jontes J.,
RA Benfenati F., Wilson M.C., Montecucco C.;
RT "Botulinum neurotoxins serotypes A and E cleave SNAP-25 at distinct
RT COOH-terminal peptide bonds.";
RL FEBS Lett. 335:99-103(1993).
RN [12]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94124495; PubMed=8294407;
RA Binz T., Blasi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C.,
RA Jahn R., Niemann H.;
RT "Proteolysis of SNAP-25 by types E and A botulinum neurotoxins.";
RL J. Biol. Chem. 269:1617-1620(1994).
RN [13]
RP MUTAGENESIS OF GLU-261; PHE-265 AND TYR-365.
RX MEDLINE=21556941; PubMed=11700044;
RA Rigoni M., Caccin P., Johnson E.A., Montecucco C., Rossetto O.;
RT "Site-directed mutagenesis identifies active-site residues of the
RT light chain of botulinum neurotoxin type a.";
RL Biochem. Biophys. Res. Commun. 288:1231-1237(2001).
RN [14]
RP X-RAY CRYSTALLOGRAPHY (3.3 ANGSTROMS).
RX MEDLINE=98455071; PubMed=9783750;
RA Lacy D.B., Tepp W., Cohen A.C., Dasgupta B.R., Stevens R.C.;
RT "Crystal structure of botulinum neurotoxin type A and implications
RT for toxicity.";
RL Nat. Struct. Biol. 5:898-902(1998).
CC -!- FUNCTION: INHIBITS ACETYLCHOLINE RELEASE. THE BOTULINUM TOXIN
CC BINDS WITH HIGH AFFINITY TO PERIPHERAL NEURONAL PRESYNAPTIC
CC MEMBRANE, IS THEN INTERNALIZED BY RECEPTOR-MEDIATED ENDOCYTOSIS.
CC THE C-TERMINUS OF THE HEAVY CHAIN (H) IS RESPONSIBLE FOR THE
CC ADHERENCE OF THE TOXIN TO THE CELL SURFACE WHILE THE N-TERMINUS
CC MEDIATES TRANSPORT OF THE LIGHT CHAIN FROM THE ENDOCYTIC VESICLE
CC TO THE CYTOSOL. AFTER TRANSLOCATION, THE LIGHT CHAIN (L)
CC HYDROLYZES THE 197-GLN-|-ARG-198 BOND IN SNAP-25, THEREBY BLOCKING
CC NEUROTRANSMITTER RELEASE. INHIBITION OF ACETYLCHOLINE RELEASE

CC RESULTS IN FLACCID PARALYSIS, WITH FREQUENT HEART OR RESPIRATORY
 CC FAILURE.
 CC -!- CATALYTIC ACTIVITY: LIMITED HYDROLYSIS OF PROTEINS OF THE
 CC NEUROEXOCYTOSIS APPARATUS, SYNAPTOBREVINS, SNAP25 OR SYNTAXIN. NO
 CC DETECTED ACTION ON SMALL MOLECULE SUBSTRATES.
 CC -!- COFACTOR: BINDS 1 ZINC ION PER SUBUNIT.
 CC -!- SUBUNIT: DISULFIDE-LINKED HETERODIMER OF A LIGHT CHAIN (L) AND A
 CC HEAVY CHAIN (H).
 CC -!- SUBCELLULAR LOCATION: SECRETED.
 CC -!- PHARMACEUTICAL: AVAILABLE UNDER THE NAME BOTOX (ALLERGAN) FOR
 CC THE TREATMENT OF STRABISMUS AND BLEPHAROSPASM ASSOCIATED WITH
 CC DYSTONIA AND CERVICAL DYSTONIA. ALSO USED FOR THE TREATMENT OF
 CC HEMIFACIAL SPASM AND A NUMBER OF OTHER NEUROLOGICAL DISORDERS
 CC CHARACTERIZED BY ABNORMAL MUSCLE CONTRACTION.
 CC -!- MISCELLANEOUS: THERE ARE SEVEN ANTIGENICALLY DISTINCT FORMS OF
 CC BOTULINUM NEUROTOXIN: TYPES A, B, C1, D, E, F, AND G.
 CC -!- SIMILARITY: BELONGS TO PEPTIDASE FAMILY M27.
 CC -!- DATABASE: NAME=BOTOX product information Web site;
 CC WWW="http://www.botox.com/index.jsp?hp&productinfo".
 CC -!- DATABASE: NAME=Protein Spotlight;
 CC NOTE=Issue 19 of February 2002;
 CC WWW="http://www.expasy.org/spotlight/articles/sptlt019.html".

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DR EMBL; X52066; CAA36289.1; -.
 DR EMBL; M30196; AAA23262.1; -.
 DR EMBL; X92973; CAA63551.1; -.
 DR EMBL; D67030; BAA11051.1; -.
 DR EMBL; M27892; AAA23269.1; -.
 DR PIR; A35294; BTCLAB.
 DR PIR; S09492; S09492.
 DR PDB; 3BTA; 01-OCT-99.
 DR MEROPS; M27.002; -.
 DR InterPro; IPR000395; Bontoxilysin.
 DR InterPro; IPR006025; Zn_MTpeptdse.
 DR Pfam; PF01742; Peptidase_M27; 1.
 DR ProDom; PD001963; Bontoxilysin; 1.
 DR PROSITE; PS00142; ZINC_PROTEASE; 1.
 KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc;
 KW Pharmaceutical; 3D-structure.
 FT INIT MET 0 0
 FT CHAIN 1 447 BOTULINUM NEUROTOXIN A, LIGHT-CHAIN.
 FT CHAIN 448 1295 BOTULINUM NEUROTOXIN A, HEAVY-CHAIN.
 FT METAL 222 222 ZINC (CATALYTIC).
 FT ACT SITE 223 223
 FT METAL 226 226 ZINC (CATALYTIC).
 FT METAL 261 261 ZINC (CATALYTIC).
 FT DISULFID 429 453 INTERCHAIN.
 FT DISULFID 1234 1279
 FT TRANSMEM 626 646 POTENTIAL.
 FT TRANSMEM 655 675 POTENTIAL.
 FT VARIANT 26 26 V -> A.
 FT MUTAGEN 261 261 E->A: DRASTIC DECREASE IN ENZYMATIC
 FT ACTIVITY.
 FT MUTAGEN 265 265 F->A: DECREASE IN ENZYMATIC ACTIVITY.
 FT MUTAGEN 365 365 Y->A: DECREASE IN ENZYMATIC ACTIVITY.
 FT CONFLICT 1 1 P -> Q (IN REF. 1).
 FT CONFLICT 479 479 E -> P (IN REF. 9).

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FT   CONFLICT      875      875      T -> L (IN REF. 8) .
FT   CONFLICT      891      891      S -> K (IN REF. 8) .
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PPEAKQVPVS YYDSTYLSTD NEKDNYLKG V TKLFERIYST DLGRMLLTSI VRGIPFWGGS
TIDTELKVID TNCINVIQPD GSYRSEELNL VIIGPSADII QFECKSFGHE VLNLTRNGYG
STQYIRFSPD FTFGFEESLE VDTNPLLGA G KFATDPAVTL AHELIHAGHR LYGIAINPNR
VFKVNTNAYY EMSGLEVSFE ELRTFGGHDA KFDLSLQENE FRLYYYNKF K DIASTLNKAK
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NRKTYLNF DK AVFKINIVPK VNYTIYDGF N LRNTNLAANF NGQNT EINN M NFKLKNFTG
LFEFYKLLCV RGIITSKTKS LDKGYNKAL N DLCIKVNNWD LFFSPSEDNF TNDLNKGEEI
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NTQIDLIRKK MKEALENQAE ATKAIINYQ Y NQYTEEEKNN INFNIDDLSS KLNESINKAM
ININKFLNQ C SVSYLMNSMI PYGVKRLED F DASLKDALLK YIYDNRGT LI GQVDR LKDKV
NNTLSTDIP F QLSKYVDNQ R LLSTFTEYI K NIINTSILNL RYESNHLID L SRYASKINIG
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ID BXA2_CLOBO STANDARD; PRT; 1295 AA.
 AC Q45894; P77780;
 DT 28-FEB-2003 (Rel. 41, Created)
 DT 28-FEB-2003 (Rel. 41, Last sequence update)
 DT 28-FEB-2003 (Rel. 41, Last annotation update)
 DE Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
 DE (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
 DE chain; Botulinum neurotoxin A, heavy-chain].
 GN BOTA OR BNA OR ATX.
 OS Clostridium botulinum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1491;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=Kyoto-F;
 RX MEDLINE=94143603; PubMed=8310180;
 RA Willems A., East A.K., Lawson P.A., Collins M.D.;
 RT "Sequence of the gene coding for the neurotoxin of Clostridium
 RT botulinum type A associated with infant botulism: comparison with
 RT other clostridial neurotoxins."
 RL Res. Microbiol. 144:547-556(1993).
 RN [2]
 RP SEQUENCE OF 1-65 FROM N.A.
 RC STRAIN=Kyoto-F;
 RX MEDLINE=97016817; PubMed=8863443;
 RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
 RT "Organization and phylogenetic interrelationships of genes encoding
 RT components of the botulinum toxin complex in proteolytic Clostridium
 RT botulinum types A, B, and F: evidence of chimeric sequences in the
 RT gene encoding the nontoxic nonhemagglutinin component."
 RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
 CC -!- FUNCTION: INHIBITS ACETYLCHOLINE RELEASE. THE BOTULINUM TOXIN
 CC BINDS WITH HIGH AFFINITY TO PERIPHERAL NEURONAL PRESYNAPTIC
 CC MEMBRANE, IS THEN INTERNALIZED BY RECEPTOR-MEDIATED ENDOCYTOSIS.
 CC THE C-TERMINUS OF THE HEAVY CHAIN (H) IS RESPONSIBLE FOR THE
 CC ADHERENCE OF THE TOXIN TO THE CELL SURFACE WHILE THE N-TERMINUS
 CC MEDIATES TRANSPORT OF THE LIGHT CHAIN FROM THE ENDOCYTIC VESICLE
 CC TO THE CYTOSOL. AFTER TRANSLOCATION, THE LIGHT CHAIN (L)
 CC HYDROLYZES THE 197-GLN-|-ARG-198 BOND IN SNAP-25, THEREBY BLOCKING
 CC NEUROTRANSMITTER RELEASE. INHIBITION OF ACETYLCHOLINE RELEASE
 CC RESULTS IN FLACCID PARALYSIS, WITH FREQUENT HEART OR RESPIRATORY
 CC FAILURE (BY SIMILARITY).
 CC -!- CATALYTIC ACTIVITY: LIMITED HYDROLYSIS OF PROTEINS OF THE
 CC NEUROEXOCYTOSIS APPARATUS, SYNAPTOBREVINS, SNAP25 OR SYNTAXIN. NO
 CC DETECTED ACTION ON SMALL MOLECULE SUBSTRATES.
 CC -!- SUBUNIT: DISULFIDE-LINKED HETERODIMER OF A LIGHT CHAIN (L) AND A
 CC HEAVY CHAIN (H) (BY SIMILARITY).
 CC -!- SUBCELLULAR LOCATION: SECRETED.
 CC -!- MISCELLANEOUS: THERE ARE SEVEN ANTIGENICALLY DISTINCT FORMS OF
 CC BOTULINUM NEUROTOXIN: TYPES A, B, C1, D, E, F, AND G.
 CC -!- SIMILARITY: BELONGS TO PEPTIDASE FAMILY M27.
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 DR HSSP; P10845; 3BTA.
 DR MEROPS; M27.002; -.

DR InterPro; IPR000395; Bontoxilysin.
 DR InterPro; IPR006025; Zn_MTpeptdse.
 DR Pfam; PF01742; Peptidase M27; 1.
 DR ProDom; PD001963; Bontoxilysin; 1.
 DR PROSITE; PS00142; ZINC_PROTEASE; FALSE_NEG.
 KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
 FT INIT MET 0 0 BY SIMILARITY.
 FT CHAIN 1 447 BOTULINUM NEUROTOXIN A, LIGHT-CHAIN.
 FT CHAIN 448 1295 BOTULINUM NEUROTOXIN A, HEAVY-CHAIN.
 FT METAL 222 222 ZINC (CATALYTIC) (BY SIMILARITY).
 FT ACT SITE 223 223 BY SIMILARITY.
 FT METAL 226 226 ZINC (CATALYTIC) (BY SIMILARITY).
 FT DISULFID 429 453 INTERCHAIN (BY SIMILARITY).
 FT DISULFID 1234 1279 BY SIMILARITY.
 FT TRANSMEM 626 646 POTENTIAL.
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 VFKVNTNAYY EMSGLEVSFE ELRTFGGHDA KFIDSLQENE FRLYYYNKF K DVASTLNKAK
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 NRKTYLNFDK AVFRINIVPD ENYTIKDGFN LKGANLSTNF NGQNT EINSR NFTRLKNFTG
 LFEFYKLLCV RGIIPFKTKS LDEGYNKALN DLCIKVNNWD LFFSPSEDNF TNDLDKVEEI
 TADTNIEAAE ENISLDLIQQ YYLTFDFDNE PENISIENLS SDIIGQLEPM PNIERFPNGK
 KYELDKYTMF HYLRAQEFEH GDSRIILTNS AEEALLKPNV AYTFSSKYV KKINKAVEAF
 MFLNWAEELV YDFTDETNEV TTMDKIADIT IIVPYIGPAL NIGNMLSKGE FVEAIIFTGV
 VAMLEFIPEY ALPVFGTFAI VSYIANKVLT VQTINNALS K RNEKWDEVYK YTVTNWLAKV
 NTQIDLIREK MKKALENQAE ATKAIINYQY NQYTEEEKNN INFNIDDLSS KLNESINSAM
 ININKFLDQC SVSYLMNSMI PYAVKRLKDF DASVRDVLLK YIYDNRGTLV LQVDR LKDEV
 NNTLSADIPF QLSKYVDNKK LLSTFTEYIK NIVNTSILSI VYKKDDLIDL SRYGAKINIG
 DRVYYSIDK NQIKLINLES STIEVILKNA IVYNSMYENF STSFWIKIPK YFSKINLNNE
 YTIINCIENN SGWKVSLNYG EIIWTLQDNK QNIQRVVFYK SQMVNISDYI NRWIFVTITN
 NRLTKSKIYI NGR LIDQKPI SNLGNIHASN KIMFKLDGCR DPRRYIMIKY FNLFDKELNE
 KEIKDLYDSQ SNSGILKDFW GNYLQYDKPY YMLNLFDPNK YVDVNNIGIR GYMYLKGPRG
 SVVTTNIYLN STLYEGTKFI IKKYASGNED NIVRNNDRVY INVVVKNKEY RLATNASQAG
 VEKILSALEI PDVGNLSQVV VMKSKDDQGI RNKCKMNLQD NNGNDIGFIG FHLYDNIAKL
 VASNWYNRQV GKASRTFGCS WEFIPVDDGW GESSL

//

ID BXE_CLOBO STANDARD; PRT; 1250 AA.
 AC Q00496;
 DT 01-JUL-1993 (Rel. 26, Created)
 DT 01-JUL-1993 (Rel. 26, Last sequence update)
 DT 28-FEB-2003 (Rel. 41, Last annotation update)
 DE Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
 DE (Bontoxilysin E).
 OS Clostridium botulinum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1491;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=Beluga;
 RX MEDLINE=92181428; PubMed=1543481;
 RA Poulet S., Hauser D., Quanz M., Niemann H., Popoff M.R.;
 RT "Sequences of the botulinum neurotoxin E derived from Clostridium
 RT botulinum type E (strain Beluga) and Clostridium butyricum (strains
 RT ATCC 43181 and ATCC 43755).";
 RL Biochem. Biophys. Res. Commun. 183:107-113(1992).
 RN [2]
 RP SEQUENCE FROM N.A.
 RX MEDLINE=92174922; PubMed=1541280;
 RA Whelan S.M., Elmore M.J., Bodsworth N.J., Atkinson T., Minton N.P.;
 RT "The complete amino acid sequence of the Clostridium botulinum type-E
 RT neurotoxin, derived by nucleotide-sequence analysis of the encoding
 RT gene.";
 RL Eur. J. Biochem. 204:657-667(1992).
 RN [3]
 RP SEQUENCE OF 1-251 FROM N.A.
 RX MEDLINE=90264400; PubMed=2160960;
 RA Binz T., Kurazono H., Wille M., Frevert J., Wernars K., Niemann H.;
 RT "The complete sequence of botulinum neurotoxin type A and comparison
 RT with other clostridial neurotoxins.";
 RL J. Biol. Chem. 265:9153-9158(1990).
 RN [4]
 RP SEQUENCE OF 1-13.
 RX MEDLINE=85197963; PubMed=3888113;
 RA Schmidt J.J., Sathyamoorthy V., Dasgupta B.R.;
 RT "Partial amino acid sequences of botulinum neurotoxins types B and
 RT E.";
 RL Arch. Biochem. Biophys. 238:544-548(1985).
 RN [5]
 RP SEQUENCE OF 419-426.
 RX MEDLINE=90344918; PubMed=2116911;
 RA Gimenez J.A., Dasgupta B.R.;
 RT "Botulinum neurotoxin type E fragmented with endoproteinase Lys-C
 RT reveals the site trypsin nicks and homology with tetanus
 RT neurotoxin.";
 RL Biochimie 72:213-217(1990).
 RN [6]
 RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=94063091; PubMed=8243676;
 RA Schiavo G., Santtuci A., Dasgupta B.R., Mehta P.P., Jontes J.,
 RA Benfenati F., Wilson M.C., Montecucco C.;
 RT "Botulinum neurotoxins serotypes A and E cleave SNAP-25 at distinct
 RT COOH-terminal peptide bonds.";
 RL FEBS Lett. 335:99-103(1993).
 RN [7]
 RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=94124495; PubMed=8294407;
 RA Binz T., Blasi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C.,
 RA Jahn R., Niemann H.;
 RT "Proteolysis of SNAP-25 by types E and A botulinum neurotoxins.";
 RL J. Biol. Chem. 269:1617-1620(1994).

CC -- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
 CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
 CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
 CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
 CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
 CC ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 180-ARG-|-ILE-
 CC 181 BOND IN SNAP-25.
 CC -- CATALYTIC ACTIVITY: LIMITED HYDROLYSIS OF PROTEINS OF THE
 CC NEUROEXOCYTOSIS APPARATUS, SYNAPTOBREVINS, SNAP25 OR SYNTAXIN. NO
 CC DETECTED ACTION ON SMALL MOLECULE SUBSTRATES.
 CC -- COFACTOR: BINDS 1 ZINC ION PER SUBUNIT (BY SIMILARITY).
 CC -- SUBUNIT: DISULFIDE-LINKED HETERODIMER OF A LIGHT CHAIN (L) AND A
 CC HEAVY CHAIN (H). THE LIGHT CHAIN HAS THE PHARMACOLOGICAL ACTIVITY,
 CC WHILE THE N-AND C-TERMINAL OF THE HEAVY CHAIN MEDIATE CHANNEL
 CC FORMATION AND TOXIN BINDING, RESPECTIVELY.
 CC -- SUBCELLULAR LOCATION: SECRETED.
 CC -- MISCELLANEOUS: THERE ARE SEVEN ANTIGENICALLY DISTINCT FORMS OF
 CC BOTULINUM NEUROTOXIN: TYPES A, B, C1, D, E, F, AND G.
 CC -- SIMILARITY: BELONGS TO PEPTIDASE FAMILY M27.

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DR EMBL; X62089; CAA43999.1; -.
 DR EMBL; X62683; CAA44558.1; -.
 DR PIR; A60027; A60027.
 DR PIR; B35294; B35294.
 DR PIR; JH0257; JH0257.
 DR PIR; S08575; S08575.
 DR PIR; S18111; S18111.
 DR PIR; S21178; S21178.
 DR HSSP; P10845; 3BTA.
 DR MEROPS; M27.002; -.
 DR InterPro; IPR000395; Bontoxilysin.
 DR InterPro; IPR006025; Zn_MTpeptdse.
 DR Pfam; PF01742; Peptidase_M27; 1.
 DR PRINTS; PR00760; BONTOXILYSIN.
 DR ProDom; PD001963; Bontoxilysin; 1.
 DR PROSITE; PS00142; ZINC_PROTEASE; 1.
 KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
 FT INIT MET 0 0
 FT CHAIN 1 421 BOTULINUM NEUROTOXIN E, LIGHT-CHAIN.
 FT CHAIN 422 1250 BOTULINUM NEUROTOXIN E, HEAVY-CHAIN.
 FT METAL 211 211 ZINC (CATALYTIC) (BY SIMILARITY).
 FT ACT SITE 212 212 BY SIMILARITY.
 FT METAL 215 215 ZINC (CATALYTIC) (BY SIMILARITY).
 FT DISULFID 411 425 INTERCHAIN (PROBABLE).
 FT CONFLICT 176 176 R -> G (IN REF. 2).
 FT CONFLICT 197 197 C -> S (IN REF. 2 AND 3).
 FT CONFLICT 339 339 R -> A (IN REF. 2).
 FT CONFLICT 772 772 I -> L (IN REF. 2).
 FT CONFLICT 962 963 FE -> LQ (IN REF. 2).
 FT CONFLICT 966 966 R -> A (IN REF. 2).
 FT CONFLICT 1194 1194 N -> NN (IN REF. 2).
 SQ SEQUENCE 1250 AA; 143712 MW; D9FCE26DDA041ER4 CRC64;
 PKINSENYND PVNDRITLYI KPGGCQEFYK SFNIMKNIWI IPERNVIGTT PQDFHPPTSL
 KNGDSSYYDP NYLQSDDEKD RFLKIVTKIF NRINNLSGG ILLEELSKAN PYLGNDNTPD
 NQFHIGDASA VEIKFSNGSQ DILLPNVIIM GAEPDLFETN SSNISLRNNY MPNSNHRFGSI
 AIVTFSP EYS FRFNDNCMNE FIQDPALTLM HELIHSLSHGL YGAKGITTKY TITQKQNPLI
 TNIRGTNIEE FLTFGGTDLN IITSAQSNDI YTNLLADYKK IASKLSKVQV SNPLLNPKYD

VFEAKYGLDK DASGIYSVNI NKFNDIFKKL YSFTEFDLRT KFQVKCRQTY IGQYKYFKLS
NLLNDSIYNI SEGYNINNLK VNFRGQANL NPRIITPITG RGLVKKIIRF CKNIVSVKGI
RKSICIEINN GELFFVASEN SYNDDNINTP KEIDDTVTSN NNYENDLDQV ILNFNSESAP
GLSDEKLNLT IQNDAYIPKY DSNGTSDIEQ HDVNELNVFF YLDAQKVPEG ENNVNLTSSI
DTALLEQPKI YTFFSSEFIN NVNKPVQAAL FVSWIQQVLV DFTTEANQKS TVDKIADISI
VVPYIGLALN IGNEAQKGNF KDALELLGAG ILLEFEPELL IPTILVFTIK SFLGSSDNKN
KVIKAINNAL KERDEKWKEV YSFIVSNWMT KINTQFNKRK EQMYQALQNO VNAIKTIIES
KYNSYTLEEK NELTNKYDIK QIENELNOKV SIAMNNIDRF LTESSISYLM KIINEVKINK
LREYDENVKT YLLNYIIQHG SILGESQQEL NSMVTDTLNN SIPFKLSSYT DDKILISYFN
KFFKRIKSSS VLNMRKNDK YVDTSGYDSN ININGDVYKY PTNKNQFGIY NDKLSEVNIS
QNDYIIIYDNK YKNFSISFWV RIPNYDNKIV NVNNEYTIIN CMRDNNSGWK VSLNHNEIHW
TFEDNRGINQ KLA FN YGNAN GISDYINKWI FVTITNDR LG DSKLYINGNL IDQKSILNLG
NIHVSDNILF KIVNCSYTRY IGIRYFNIFD KELDETEIQT LYSNEPNTNI LKDFWGNYLL
YDKEYYLLNV LKPNNFIDRR KDSTLSINNI RSTILLANRL YSGIKVKIQR VNNSSTNDNL
VRKNDQVYIN FVASKTHLFP LYADTATTNK EKTIKISSSG NRFNQVVVMN SVGNCTMNFK
NNNGNNIGLL GFKADTVVAS TWYYTHMRDH TNSNGCFWNF ISEEHWQEK

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